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Numerical modeling of photonic crystal fibers using the finite element method

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Abstract

© Published under licence by IOP Publishing Ltd.Propagation constants and amplitudes of eigenwaves of photonic crystal fibers are calculated numerically using an algorithm based on combination of the exact nonlocal boundary conditions method and the finite-element method. The design of fibers has a central large core filled with nematic liquid crystal. We investigate the influence of radii of the cladding air holes and their number as well as radius of the central liquid crystal on the spectral characteristics of fibers. Our results strongly suggest that radius of the crystal in contrast to the size and the number of capillaries has a significant influence on eigenwaves and propagation constants. Varying this radius we control the number of solutions of the problem for a fixed wavelength.

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